through internal conduit 890' to the column 102 through isolation ~~valve~~ pin valve 4.

[0085] The needle 12 is then fluidically coupled to the sample loop 22 by means of the internal conduit 812' of isolation ~~valve~~ pin valve 1 being fluidically coupled to the opening 894' of internal conduit 898'. Correspondingly, the syringe 32 is fluidically coupled to the sample loop 22 by means of the internal conduit 898' being fluidically coupled to opening 896' of internal conduit 876'. The syringe 32 is then used to aspirate the sample fluid into the sample loop 22 from the needle 12.

[0086] During the transition phase, the moving member 804' is shifted laterally so that isolation ~~valve~~ pin valve 1 interfaces with opening 894' and isolation ~~valve~~ pin valve 2 interfaces with opening 896', thereby isolating flow from the needle 12 to the syringe 32. Correspondingly, the internal conduit 58' of isolation ~~valve~~ pin valve 3 interfaces with opening 892' of internal conduit 886'. Internal conduit 96' of isolation ~~valve~~ pin valve 4 interfaces with opening 874' of internal conduit 876'.

854'. The flexible conduit 836 is coupled to the isolation ~~valve~~ pin valve 6 of linear isolation valve 800 by means of coupling 70.

0073
[~~0078~~] Flexible conduit 852' is fluidically coupled to needle 12 to fluidically couple with the internal conduit 812' of isolation ~~valve~~ pin valve 1 which is movably disposed within the stationary member 802' such that isolation ~~valve~~ pin valve 1 can move up and down and so that the internal conduit 812' of ~~valve~~ pin valve 1 is in fluidic communication with a first opening 892' of an enclosed flow through channel 886' that passes through the movable member 804' to fluidically couple to the sample loop 22 through flexible conduit 834'.

0074
[~~0079~~] Syringe 32 is fluidically coupled to flexible conduit 856' which in turn fluidically couples with the internal conduit 858' of isolation ~~valve~~ pin valve 2 which is movably disposed within the stationary member 802' such that isolation ~~valve~~ pin valve 2 can move up and down and so that the internal conduit 858' of ~~valve~~ pin valve 2 is in fluidic communication with a first opening 874' of a flow through internal conduit 876' that passes through the movable member 804' to fluidically couple to the sample loop 22 through flexible conduit 836'.

0077
[~~0082~~] To seal the isolation pin valves ~~pins~~ 1, 2, 3 and 4, the stationary member 802' includes self-energized lip seals 820a' and 820b', respectively.

0078
[~~0084~~] During the load phase, the isolation pin valve ~~poin~~ 3 is positioned to interface with opening 860' on the surface 810' of movable member 804'. Similarly, the isolation ~~valve~~ pin valve 4 is positioned to interface with opening 880' also on the surface 810' of movable member 804'. These actions effectively isolate flow from the high pressure pump 101 to the sample loop 22 since the flow from the pump 101 is now recirculated from ~~valve~~ pin valve 3

valve 6 is positioned to interface with open port 880 on the interfacing surface 810. The open port 880 is in fluidic communication with the volume of space 812.

0071
[~~0076~~] The linear flow through injection valve 850 is analogous to the rotary injection valve 300. The linear valve 850 comprises stationary member 802' and a movable member 804'. The two members 802' and 804' interface at surface 810'. The movable member 804' slides along the surface 810' while the stationary member 802' remains in place. In this configuration, ~~pin~~ isolation pin valve 3, having an internal conduit 58' and which receives the fluid flow transferred from the high pressure pump through flexible conduit 834, penetrates the stationary member 802' at port 822'. The ~~pin~~ isolation pin valve 3 is coupled to conduit 834 by means of coupling 62' and is movably disposed within the stationary member 802' such that isolation ~~valve~~ pin valve 3 can move up and down and so that the internal conduit 58 of pin valve ~~poin~~ 3 is in fluidic communication with a first opening 860' of a flow through internal conduit 890' that passes through the movable member 804' to second opening 880'. Both the first opening 860' and the second opening 882' interface with a chamber or volume of space 812' within the stationary member 802' that is bordered by the interfacing surface 810'. The stationary member 802' and the movable member 804, act to seal the chamber 812'.

0072
[~~0077~~] Isolation ~~valve~~ pin valve 4 is movably disposed within the stationary member 802' in second opening 880' such that isolation ~~valve~~ pin valve 4 is in fluidic communication with the second opening 880' of the enclosed flow through channel 890'. Isolation ~~valve~~ pin valve 4, having an internal conduit 96 and which transfers the fluid flow from the high pressure pump 101 to the column 102 through flexible conduit 836, penetrates the stationary member 802' at port 824' and is coupled to flexible conduit 836 by means of coupling

imposed by Belleville spring washer 232. The spherical nuts 228 and 230 (not shown) are supported by, and penetrate through, housing end plates 312 and 314, respectively.

0064
[~~0069~~] Tube fitting 7 from the high pressure pump 101 is inserted into port 352 of the movable member 804 where it is sealed in a manner as to substantially prevent external leakage. Flow is provided from the high pressure pump 101 to the pin fitting 7 by means of flexible conduit 316 and coupling 312. The internal conduit 38 within the fitting 7 is in fluidic communication with internal conduit 840 within the movable member 804 and with an open port 860 on the interfacing surface 810. The open port 860 is in fluidic communication with a chamber or volume of space 812 within the stationary member 802 that is bordered by the interfacing surface 810. The volume of space 812 within the stationary member 802 and the movable member 804 are sealed by the self-energized lip seals 808a and 808b. Isolation ~~valve~~ pin valve 5 penetrates through stationary member 802 at penetration 822 such that the ~~valve~~ pin valve 5 can move linearly up and down.

0065
[~~0070~~] By means of coupling 62, the internal conduit 58 within ~~valve~~ pin valve 5 is in fluidic communication with conduit tubing 834 to the ~~pin~~ isolation pin valve 3 of linear flow through injection valve 850. Conduit tubing 66 from the face seal valve 10 is then fluidically coupled to the internal conduit 82 of ~~pin~~ isolation pin valve 78 by means of coupling 70.

0066
[~~0071~~] Similarly, isolation valve pin 6 penetrates through stationary member 802 at penetration 824 such that the ~~valve~~ pin valve 6 can move linearly up and down. The internal conduit 82 within ~~pin~~ isolation pin valve 78 is then in fluidic communication with the volume of space 812 within the stationary member 802 that is bordered by the interfacing surface 810. The ~~valve~~ pin

column 102.

[0055] The rotor 61 is shown in a cutaway view disposed between stators 202 and 204. The rotor 61 is sealed by a set of three sealing layers 206 and 208 set around the ~~valve~~ pin valves 5 and 6, respectively. The preferred materials for the sealing layers 206 and 208 comprise PEEK, PTFE (polytetrafluorethylene), PEEK in that order.

[0058] FIG. 2B is an exploded view of a portion of the components comprising a first variation of the embodiment of the flow through isolation valve 200. Pump supply fitting ~~101~~ 7 interfaces with port 78 in the rotor 61 and outlet supply to column fitting ~~102~~ 8 interfaces with port 80 in the rotor 61. Face seal valve supply pin 6 (not shown) is surrounded by stator 204 and interfaces with one end of the rotor 61 while face seal valve discharge pin 5 (not shown) is surrounded by stator 202 and interfaces with the opposite end of the rotor 61. During normal operation, only the pins 5 and 6 which are surrounded by the stators 202 and 204 are moved either away from or back towards the rotor 61. The pump supply fitting ~~101~~ 7 and outlet supply to column fitting ~~102~~ 8 are maintained normally in position except that they are rotated together with the rotation of the rotor 61. The rotor 61 and rotor clamp 94 are rotated around the centerline 200CL by means of drive gear 205.

[0059] FIG. 3C and FIG. 3D are ~~is a~~ detail views of a portion of the isolation valve assembly of FIG. 3A. As before, the rotor 61 is positioned so that stators 202 and 204 are disposed on either end of the rotor 61. Belleville springs 220 and 222 deflect the axial loads along the centerline 200CL which act on the rotor 61. The Belleville spring 220 is mounted on an end of stator 202 by means of load washer 224. The load washer 224 is locked into position by spherical nut 228. Sealing layer set 206 is compressed by the axial force

50 through ~~valve~~ pin valve 3 at port 46 while high pressure tubing 38 is fluidically coupled to internal channel 50 through ~~valve~~ pin valve 4. The high pressure tubing 36 is fluidically coupled to isolate rotor 61 through ~~valve~~ pin valve 5 which interfaces with the rotor 61 at blank port 82. Correspondingly, the high pressure tubing 38 is fluidically coupled to isolation rotor 61 through ~~valve~~ pin valve 6 which interfaces with the rotor 61 at blank port 84. Therefore, during the load phase, the pressure within the high pressure tubing 36 and 38 is substantially atmospheric, i.e., 0 psig or 0.101 MPa absolute.

[~~0049~~ 0044] FIG. 1B illustrates the transition phase between loading of the sample into the sample loop 22 and the injection phase where the sample within the loop 22 is injected by high pressure pump 101. During the transition phase, the isolation rotor 61 remains in the same position as during the load phase. Only orientation of the inject rotor 11 is changed. Specifically, the rotor 11 is rotated so that the ~~valve~~ pin valves 1 and 2 are disconnected from the sample loop 22, thereby isolating the needle 12 and the syringe tube 32 from the sample loop 22. The ~~valve~~ pin valve 1 is inserted into port 40 while the ~~valve~~ pin valve 2 is inserted into port 42 so that the needle and syringe are fluidically coupled to each other through internal conduit 44.

[~~0050~~ 0045] FIG. 1C illustrates the injection phase when high pressure liquid is supplied from the pump 101 to sample loop 22 and on to the column 102. Specifically, in the injection phase, the rotor 11 remains in the position achieved during the transition phase. The rotor 61 is rotated so that the ~~valve~~ pin valves 5 and 6 are disconnected from the blank ports 82 and 84, respectively. The ~~valve~~ pin valve 5 is now connected to port 70 so as to cause fluidic communication between the pump 101 and the high pressure tubing 36. Correspondingly, the ~~valve~~ pin valve 6 is now connected to port 72 so as to cause fluidic communication between the high pressure tubing 38 and the

Change(s) applied to document, /A.G./ 3/12/2012

Specification:

Please amend the specification as follows:

0031
[0036] FIG. 3C and FIG. 3D are ~~is a~~ detail views of a portion of the rotary isolation valve assembly of FIG. 3A.

0037
[0042] In particular, in FIG. 1A, an inject rotor 11 of an injection valve 300 of combination or multiple isolation valve 10 is shown in a load phase in fluidic communication with a needle 12 to a ~~valve~~ pin valve 1 at a port 14 on a side of rotor 11. The combination or multiple isolation valve 10 is comprised of an isolation valve 200 and the injection valve 300. Sample fluid flows from the pin valve 1 into internal conduit 16. The sample fluid flows through typically a substantially 90 degree bend 15 to a port 18 on the outer surface of the rotor 11. The port 18 is preferably fluidically coupled to an inlet flexible tube 20 and correspondingly to the sample loop 22 so that the sample fluid flows into the sample loop 22 and flows out through an outlet flexible tube 24.

0038
[0043] The outlet flexible tube 24 is preferably fluidically coupled to a port 26 that is on the outer surface of rotor 11 through a ~~valve~~ pin valve 2 and in turn to an internal conduit 28. The sample fluid flows through typically a substantially 90 degree bend 29 to a port 30 on an opposite side of the rotor 11. A syringe 32 can be fluidically coupled to the port 30 so as to provide negative pressure in the flexible tube 24, sample loop 22, flexible tube 20 and needle 12 for drawing up the sample fluid and to permit the sample fluid to be aspirated into the sample loop 22.

0040
[0045] During the load phase, the inject rotor 11 is isolated from the high pressure pump 101 and column 102 by means of an isolation rotor 61. The two rotors 11 and 61 interface through high pressure tubing 36 and 38. In particular, high pressure tubing 36 is fluidically coupled with internal channel